

ECTOPARASITE AND *Rickettsia tsutsugamushi* STUDIES IN THAILAND

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OBJECTIVE : To establish and describe the chiggers and ticks that are vectors or potential vectors of human pathogens in Thailand, and to determine the geographical distribution of *Rickettsia tsutsugamushi* in natural populations of chiggers in Thailand.

BACKGROUND : This is a continuation of previously reported studies (1). Earlier work during the period 1961-1972 served as the basis for a number of publications, of which Lakshana (2) and Lekagul and McNeely (3) have established a firm taxonomic base on which epidemiological-ecological studies on *Rickettsia tsutsugamushi* in Thailand can proceed. Recent emphasis has shifted to the distribution of strains of *R. tsutsugamushi* that occur in vector chiggers in Thailand. However, problems still exist in identifying chigger specimens collected in Thailand, hence taxonomic studies on chiggers are continuing.

METHODS : Ectoparasites are collected from live-trapped rodents and other small mammals by removal with forceps, by scraping or by holding the animals alive over a pan of water and allowing engorged ectoparasites to drop into the water. Engorged chiggers are normally preserved in alcohol and mounted on slides for study. Chiggers used for *R. tsutsugamushi* isolation attempts are preferably unengorged. Unengorged chiggers are usually found in leaf litter, on rotten logs and other favorable habitats frequented by rodents and other small mammals, and are easily collected by using 5" x 5" formica black plates. Collected unengorged chiggers are placed and kept alive in vials of water, which are then shipped to USAMRU-Kuala Lumpur for rickettsia isolation. A technique using direct immunofluorescence has recently been developed to detect rickettsia in naturally infected mites (4). Using this technique, the internal contents of each unengorged chigger can be screened for nine different strains of *R. tsutsugamushi*, i.e., Karp, Gilliam, Kato, TC 586, TA 678, TA 686, TA 716, TA 763 and TH 1817. After the internal contents of the chigger have been tested for rickettsia, its exoskeleton is mounted in Hoyer's mounting media on a slide for identification.

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RESULTS : For many years *Leptotrombidium* (*Leptotrombidium*) *deliense* was the only chigger species from Thailand from which *Rickettsia tsutsugamushi* had been isolated. During the last several years, however, collaborative studies between this department and the US Army Medical Research Unit, Kuala Lumpur, have been able to isolate several strains of this pathogen from at least 9 different chigger species in Thailand (5, 6). These species are : *Eutrombicula wichmanni*, *L. (L.) arvinum*, *L. (L.) deliense*, *L. (L.) scutellare*, *L. (L.)* sp. A (undescribed), *L. (L.)* sp. B (undescribed), *Leptotrombidium* (*Trombiculindus*) *paniculatum*, *Microtrombicula chamlongi* and *Odontacarus* sp. (undescribed). Since most of these species are very poorly known, studies to define their biology and ecological requirements have continued. During the period 5 Sept. 80 - 30 Aug. 81, 310 collections from birds, mammals, black plates and others were made in 4 provinces of Thailand (Table 1). These collections resulted in over 21,000 specimens of chiggers, lice, fleas, mites and ticks (Table 2). The specimens and ecological data from these collections currently are being analyzed. Several morphological variations of *L. (L.) deliense* have been found from higher elevations in Chiang Mai Province. Such variations previously have not been encountered in Thailand. However, since approximately 19 new species of the subgenus *Leptotrombidium* are being prepared for publication, these variations of *deliense* require further study.

A Checklist of the Ticks of Thailand has been completed and has received clearance for publication.

These studies are continuing.

Table 1. Ectoparasite collections made in Thailand during period 5 Sept. 1980-30 Aug. 1981.

Location (Province)	Date	Host or Technique				Total
		Bird	Mammal	Black Plate	Other	
Chiang Mai	Oct 1980- May 1981	63	140	43	1	247
Kanchanaburi	Aug 1981	-	53	2	-	55
Samut Prakan	Nov 1980	4	-	-	-	4
Samut Sakhon	Sept 1980, Nov 1980	4	-	-	-	4
Total	-	71	193	45	1	310

Table 2. Ectoparasite specimens collected in Thailand during period 5 Sept. 1980-30 Aug. 1981.

Location (Province)	Number of Specimens					Total
	Chiggers	Lice	Fleas	Mites	Ticks	
Chiang Mai	14,412	15	29	210	135	14,801
Kanchanaburi	7,020	-	-	-	-	7,020
Samut Prakan	-	13	-	-	-	13
Samut Sakhon	-	18	-	-	-	18
Total	21,432	46	29	210	135	21,852

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